

Translated from the Norwegian

# NORWEGIAN PATENT

No. 63947

SPECIFICATION  
WITH RELEVANT DRAWING  
MADE AVAILABLE TO THE PUBLIC BY THE OFFICE  
FOR THE PROTECTION OF THE INDUSTRIAL PROPERTY  
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[Title in Norwegian of the object of the invention:]

Anordning ved etasjeovner for vedfyring

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## ARRANGEMENT IN MULTI-STAGE FURNACES FOR FIREWOOD STOKING

The proposed invention pertains to multi-stage (story) furnaces for firewood stoking of furnaces of the kind, wherein primary air is supplied to the lower part of the furnace chamber's front end and also to its rear end, and the invention mainly consists in such an arrangement for the supply of preheated secondary air that this

supply occurs continuously and unaffected by the supply of primary air, thus that an effective combustion of the combustion gases is always ensured, and - therewith - an economically feasible stoking [feeding fuel and tending a furnace] without a superfluous and bothersome generation of soot and tar.

An exemplified embodiment form of the invention is specified in the attached drawing, wherein

Fig 1 is a vertical longitudinal section of the furnace's combustion chamber or firebox.

Fig 2 is a horizontal section along the line II - II in Fig. 1.

Fig 3 is the rear baffle plate [protective plate] seen from the front.

In the drawing, reference symbol 1 denotes the combustion chamber with the lined bottom plate 2, the top plate 3, the side plates 4 , 5, having baffle plates 4', 5', and the front- and the rear-plate 6 dan 7, respectively.

An opening in the front plate 6 is covered by a combustion chamber (firebox) door 8 - which is surface-ground or face-ground with respect to the front plate - having a conventionally adjustable valve 9, through which and [also through] a preheating channel 10, arranged on the door's inner side, primary air is supplied to the combustion chamber 1 to its lower part by the way of the opening 11.

Above the firebox door 8, the front plate 6 is equipped with a number of nozzles 12, through whose openings secondary air is continuously - and independently of the primary-air supply - supplied to the combustion chamber's upper part, for which purpose waste furnace gases and flames from the combustion at the chamber's foremost part ascend before they are discharged through the opening 13 in the top plate's 3 rear part, and the said secondary air thus supports the gases' complete combustion.

On the outer side, the nozzle openings are covered by a preferably downward open cap 14, which is used to preheat the inflowing air, and, concurrently, to provide a guarantee against the eruption of smoke.

At some interval from the inside of the rear plate 7, there is arranged a baffle plate 15 in such a way that between them there originates a chamber 16, having the shape of a channel, which by means of an opening 17 in the rear plate - which opening is arranged at the lower part - communicates with the atmosphere.

At its lower part the baffle plate is outfitted with a number of nozzles 18 (in this case, four) through which primary air is introduced into the rear, lower part of chamber 1. Above the nozzles 18, a number of nozzles 19 (in this case, six) are arranged on the plate 15, which communicate with the channel 16, and are used for the introduction of preheated secondary air to the rear part of the chamber 1.

The flow-through [flow-rate] opening of the nozzles 18, 19 can be selected as desired, and according to the prevailing ratios, however, very favorable results were attained over the course of trials by dimensioning the nozzle openings in such a way that the total cross-sectional area for the supply of primary air corresponds to the cross-sectional area for the supply of secondary air. Again, the nozzles' number and placement can be varied.

The opening 17 in the ear plate 5 does not need to be shuttable or adjustable, but if this is desired it can be outfitted with a conventional adjustable stop valve 20.

In the case of the arrangement shown and described, the nozzles 18 are maintaining under way a primary combustion so that this combustion - after the furnace is operated at full capacity - will be sustained over the furnace chamber's entire length while the nozzle 19 - together with the nozzle 12 in the front plate - supply to the combustion the required amount of secondary air, as a result of which the gases that have not burned up, flow up through the opening 19, and, as a result of this, are drawn off.

In the case of the furnaces, having the structural design thus described, it has been possible - using a single loading or charge - to maintain the furnace burning over a period of twelve hours, and using that loading, it burns in a particularly

economically feasible way without the excessive and bothersome formation of soot and tar, which - otherwise - are common over the course of firewood stoking, having a reduced air-supply.

#### P a t e n t C l a i m s:

1. Arrangement in the case of multi-stage (story) furnaces for firewood stoking of furnaces of the kind, in which primary air is supplied both to the lower part of the combustion chamber's front-end, and also its rear-end, characterized in that at the combustion chamber's upper end, there are arranged nozzle apertures for the supply of secondary air to both ends of the combustion chamber, which nozzle apertures are freely communicating with the atmosphere, and discharge into the combustion chamber.

2. Device as claimed in claim 1, characterized in that the nozzle openings at the combustion chamber's front-side exterior are covered by a cap - known in the abstract - which is being used to preheat the air as well as to provide guaranty against the eruption of smoke.

3. Device as claimed in claim 1 and 2, characterized in that the nozzles (19) at the furnace's rear part are designed in the rear baffle plate (15), and discharge in

a channel-shaped preheating chamber (16) - shaped between this and the rear plate - known in the abstract, which channel-shaped preheating chamber - at its lower part - communicates with the atmosphere by means of an opening (17)

4. Device as claimed in claim 1 and 3, characterized by nozzles (18) for the supply of primary air, which are arranged at the lower end of the baffle plate (15).

5. Device as claimed in claim 3 and 4, characterized in that the total cross-sectional area of the nozzle openings (19) for secondary air correspond to the total cross-sectional area of the nozzle openings (18) for primary air.

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